Early Carboniferous synorogenic basins evolution of the Ossa-Morena and Galicia-Trás-os-Montes zones (Iberia): a tectonic model

Evolución de las cuencas sinorogénicas del Carbonífero inferior de las zonas de Ossa-Morena y de Galicia-Trás-os-Montes: un modelo tectónico

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Abstract: The stratigraphic record of the Early Carboniferous in Iberia reveals that synorogenic deposition was important and occurred simultaneously in basins influenced by extension and contraction with gravitational instability. In NW Iberia (Galicia – Trás-os-Montes Zone) contraction was dominant and the deposition took place in a forebulge outwards from the nappe stacking front. Here, synorogenic deposits were strongly affected by folding and thrusting as they were imbricated and incorporated in the allochthonous pile. In a different way, in SW Iberia (Ossa-Morena Zone) synorogenic deposition was influenced by extension and happened simultaneously with the onset of significant magmatism.

Key words: Synorogenic deposition, Magmatism, Contraction and extension, Early Carboniferous, Variscan orogeny,

Resumen: *El registro estratigráfico del Carbonífero inferior en Iberia muestra que la sedimentación sin-orogénica fue importante y se produjo simultáneamente en cuencas condicionadas por extensión y contracción bajo inestabilidad gravitacional. En el NO de Iberia (Zona de Galicia-Trás-os-Montes) dominó la contracción y la sedimentación tuvo lugar en relación con una flexura generada por delante del frente de apilamiento de los cabalgamientos. En este contexto, los depósitos sin-orogénicos fueron fuertemente afectados por la deformación (plegamiento y cabalgamiento) a medida que resultaban imbricados. En contraste, en el SO de Iberia (Zona de Ossa-Morena), la sedimentación sin-orogénica se desarrolló en una situación extensional y coincidió con el comienzo de un importante evento magmático.*

Palabras clave: *Sedimentación sin-orogénica, Magmatismo, Contracción y extensión, Carbonífero Inferior, Orogenia Varisca.*

INTRODUCTION

A full understanding of the long-term evolution of mountain building, denudation and related development of synorogenic basins requires an integrated tectonic model based on the combination of the impacts of crustal thickening, uplift, relief rejuvenation, renewed sediment supply, magmatism and response of lithosphere to changes in the load.

This study describes the stratigraphy of Early Carboniferous synorogenic basins of the Ossa-Morena Zone (OMZ, SW Iberia), related magmatism and tectonic setting in order to make a comparison with the same age synorogenic basins of the Galicia-Trás-os-Montes Zone (GTMZ, NW Iberia).

The Early Carboniferous deposition in synorogenic basins of Iberia is a consequence of denudation of Variscan reliefs edified during the oblique convergence between Laurussia and Gondwana (Variscan orogeny; Martínez Catalán et al., 2016), in the wake of the Pangea's amalgamation. This synorogenic stage is related to a collisional setting during which contractional and extensional basins, more or less controlled by transcurrent movements, evolved synchronously.

The complex tectonic system described herein explains several structural features of the Variscan orogen, the strain-partitioning, and the different evolution of synorogenic basins and the spatial and temporal distribution of magmatism during the time interval of ca. 359-331 Ma (Tournaisian-Visean).

The approach presented here is critical to test stratigraphic correlations between NW and SW Iberia and to integrate the spatial distribution of synorogenic sedimentation and magmatism in the tectonic framework of the Variscan orogen.

EARLY CARBONIFEROUS SYNOROGENIC BASINS